

Applications of Anomaly Detection and Precursor Identification in Airspace Operations

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As we continue to advance the U.S. National Airspace into the next generation of air traffic, we face challenges in both increase in complexity, as well as, a significant growth in traffic volume. Addressing these challenges, while maintaining the same level of safety is an important application of data mining. Because of these significant shifts in airspace design and usage there is a need to identify current and emergent safety risks along with their potential precursors. In recent years NASA has made advancements in developing scalable methods to address this effort in the Big Data paradigm. Multiple kernel anomaly detection approaches have been employed on both surveillance radar data and flight operational quality assurance data to identify operationally significant safety risks. Additionally, events have been explored with a recently developed precursor identification tool to discover states that reveal an increased probability of a safety event. These tools can be used to discover emerging safety risks that may not be currently monitored, which allows for mitigation tactics to be employed and ultimately make the overall airspace safer. This talk will discuss an overview of these methods and a discussion of the findings.